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mainly to his "Electromagnetic Theory of Light," "one of the most splendid monuments ever raised by the genius of a single individual." All of the early investigators in the theory of energy received a peculiar bias from the fact that the theory of energy was developed from the theory of work—the production of "useful work" being one of the most important problems in the life of nations as of men. Hence the statement that "energy is the capacity of doing work" was evidently received and accepted by scientific men before and during Maxwell's time as expressing an advanced scientific generalization; and even now, when not too critically examined, might pass as equivalent to the statement: Energy is the universal natural agency by means of which work is done. But while the former statement is logically weak and leads to ambiguities and contradictions the latter statement is perfectly definite, consistent with Maxwell's showing that work is a transference of energy and with that broad general principle, the conservation of energy.

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A PECULIAR BREED OF GOATS

TO THE EDITOR OF SCIENCE: There is a peculiar breed of goats raised in central and eastern Tennessee. When suddenly frightened the hind legs become stiff and the animal jumps along until it recovers and trots off normally or if greatly frightened the front legs become stiff also and the goat falls to the ground in a rigid condition. They have received the name of "stiff-legged" or "sensitive" goats.

The farmers in Tennessee prefer them because they do not jump fences. They are snow white and look like ordinary goats.

We are starting experiments to determine whether this is a dominant or recessive characteristic in comparison with a normal goat.

When this peculiar affliction first appeared I can not say, but it seems to be possessed by all the goats in the section named.

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SCIENTIFIC BOOKS

The Natural History of Hawaii: Being an Account of the Hawaiian People, the Geology and Geography of the Islands, and the Native and Introduced Plants and Animals of the Group. By WILLIAM ALANSON BRYAN, Professor of Zoology and Geology in the College of Hawaii. Honolulu, Hawaii, The Hawaiian Gazette Co., Ltd. 1915. Distributors, H. S. Crocker & Co., 565 Market Street, San Francisco; G. E. Stechert & Co., 151 West 22d Street, New York. Price \$5.50.

In 1907 and 1908 the American Association for the Advancement of Science thought seriously of going to Hawaii in the near future for a summer meeting. Prominent citizens of Hawaii joined the association in anticipation of this visit, and invitations from Hawaiian institutions were received in number. The then governor of the Islands, Mr. Freear, called on the Permanent Secretary in Washington, and Professor W. A. Bryan, of the College of Hawaii, attended the Chicago and Dartmouth meetings of the association in 1908, urging the mid-Pacific meeting. But difficulties of transportation arose, and the plan was finally abandoned at least until some future date. Professor Bryan's effort, however, was not without result, since during his visit he gained his charming wife, and has now brought out his great book on the natural history of Hawaii, thus bringing the islands to the continental members of the association to console them for the abandonment of the Hawaiian meeting.

Practically alone among the great scientific societies in this country, the American Society of Naturalists has preserved in its title the old idea of natural history. The old natural history is still talked about and written about, while the old natural philosophy, so-called, has gone out. But the old-fashioned natural history books, with their great charm and interest to a large class of readers, are seldom published nowadays.

This book of Professor Bryan's, however, is a real natural history. It covers in its six hundred pages the whole field. Section I,

with its seven chapters, treats of the Hawaiian people, telling of the coming of the Hawaiian race, the effect of the tranquil environment of the islands upon the people, discussing also their physical characteristics and their culture in a broad way. Section II., with fourteen chapters, treats of the geology, geography and topography of the islands, including two chapters on the world's greatest active volcano, Kilauea. Section III. gives a consideration of the flora of the islands, devoting one chapter to the plant life of the seashore and the lowlands, and the other to the vegetation of the high mountains. Section IV. is on agriculture and horticulture in Hawaii, with four chapters. All of this portion of the volume is included in what is termed "Book I." Book II., in the same volume, considers the animal life of the group and devotes seventeen chapters to its consideration.

Of course the field covered is so great that the author can not pretend to speak authoritatively on all points, but he has carefully studied the writings of the many experts who have written about the differing topics, and acknowledges the assistance of many naturalists. But all information has been sifted and studied by the author who for many years has led an active naturalist's life in the islands.

The volume is elaborately illustrated with half-tones from original photographs, and includes 117 full-page plates from 435 negatives. Many of the plates are extremely beautiful.

The characteristics of the people are admirably explained by their environment. They were preeminently an agricultural people, and the lack of domestic and wild animals prevented them from following the hunting and pastoral life. As a result, they settled in permanent villages usually along the coast. "Since there were no noxious insects, poisonous serpents or dangerous birds or beasts of prey, there was no occasion for the alertness and constant fear that so frequently makes life in a tropical country a never-ending strain if not an actual burden." An interesting paragraph on the medicine of the Hawaiians indicates a very considerable degree of medical and surgical skill. It is inter-

esting to note further that boxing was perhaps their national game, and was regulated by certain rules, umpires being appointed, and the victor defending the ring against all comers.

What one notes all through the book is an extraordinary condition of the fauna and their place. Some of these changes have been due to the struggle for existence alone; others have occurred directly through the agency of man. As an example of this last, the sandalwood trade, beginning about 1792, resulted in the practical extermination of that valuable tree. As early as 1831 the trade was on the decline, and by 1856 the wood had become very scarce. Many trees and plants purposefully introduced have thrived in an extraordinary way, some of them in fact becoming important pests. The mesquite of the southwestern United States and Mexico, straggly, unimposing, although very useful, shrub-like tree that it is, becomes in Hawaii a rather imposing feature of the landscape; glorious specimens grow in some gardens of the city of Honolulu, and the large pods form one of the most important stock foods. On the other hand, the lantana weed, introduced for ornament, speedily became so abundant as to ruin the land over large stretches of the country, driving out every other plant. Inspired by their success in introducing beneficial insects to prey upon injurious insects, the Sugar Planters Association imported certain plant-feeding insects to kill off the lantana. This experiment, although very dangerous and never to be advised, was in this case apparently very successful, and the lantana, although still abundant, is no longer a serious pest.

It is interesting to note that there are no land snakes in Hawaii.

An interesting section deals with the whaling industry, since the Hawaiian Islands were in the center of this trade for many years, the industry reaching its height in 1852, thousands of native Hawaiians being employed as whalers.

The consideration of the birds of the islands is very full, although to the casual visitor there seem to be practically no birds. Although there are 125 or more species enumerated, not more than half a dozen can be seen

in the city of Honolulu, and all of these have been introduced. In glancing through the bird section, I note on page 326 the heading "The Legend of Maui and the Alae," and this reminds me to mention the fact that all through the book are scattered native legends which add greatly to its interest.

Reverting again to the extinction of native forms, the statement is made on page 333 that the island of Oahu can make the melancholy boast that it has a greater list of extinct birds, in proportion to the total number of species known from the island, than any other like area in the world.

One of the most attractive fields of natural history study in the islands is that of the fishes. Fish have always been one of the chief articles of animal food of the natives, and many strange and beautiful species abound in Hawaiian waters. The collection of native fishing apparatus in the Bishop Museum is a revelation to the modern fisherman. The natives caught fish in many most ingenious ways, and were expert in making a certain fish poison known as *holahola*. They were expert shark fishers in the olden times, and the use of human flesh as bait was in great vogue. The person to serve as bait was killed two or three days in advance of the anticipated fishing expedition. His flesh was then cut up, placed in a container and left exposed to the air to decompose. Interesting but gruesome! In walking through the markets of Honolulu to-day, the visitor from the States is able to recognize practically none of the fishes exposed. The fish fauna of Hawaii is isolated from that of other lands, although most of the common families of sea fish have local representatives, some of them excelling in flavor the species which exist elsewhere. One is greatly attracted by the "butterfly fish" on account of their bright colors.

The chapters on native and introduced insects are very interesting; and of course every naturalist knows the tremendous interest attaching to the land and fresh-water shells of the islands, and their weight in the discussion of evolutionary problems.

There seems to be at least one striking exception to the general rule which we have men-

tioned, of the easy adaptation of other forms of animal life to the Hawaiian climate, in the case of the eastern oyster, which has repeatedly been introduced, but which has never become acclimatized.

In the portion relating to sea life the book is especially interesting, and the story of the plants and animals from the coral reefs is fascinating.

Scientific men have been criticized frequently in the columns of *SCIENCE* for bad writing. The criticism can not hold for the author of this book, since it is written in a style which even the professor of English at Harvard would, I think, like to claim for his own. The writer of this note can not improve upon a sentence which has been used by Professor Vaughn MacCaughy in writing of this "Natural History of Hawaii": "It is a great guide book to the life of the tropical Pacific; it is encyclopedic in its wealth and precision of detail, and philosophic in its breadth of treatment."

L. O. HOWARD

Exercise in Education and Medicine. By R. TAIT MCKENZIE, B.A., M.D. Second Edition. W. B. Saunders Company. 1915.

Muscular exercise has played an important part in man's history whether considered from the standpoint of his health, growth and physical development, or his achievements and progress in civilization. As a branch of science, the application of exercise in education and medicine is in its infancy. The extravagant claims of dabblers and charlatans have done much to confuse the real issues and to retard progress.

Dr. McKenzie has made a valuable contribution to the subject by bringing together in this volume all the available material representing the present status of our knowledge concerning the application of muscular exercise in education and medicine. Since the appearance of the first edition four years ago, this book has been the chief reference work on the subject of exercise. The second edition has been completely revised and enlarged to include all the new material which represents the considerable progress made in the subject during the past four years.